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## Reporting stress in simultaneous interpreting. The analysis of trainee interpreters' retrospective reports and outputs

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## Abstract

The aim of this study is to determine the sources of stress for trainee interpreters and the coping strategies and/or stress-prevention strategies they adopt. It relies on retrospective protocols of trainees, in which they report stress experienced during simultaneous interpreting task. The study also triangulates process analysis (data in the form of retrospective protocols) with product analysis (manual comparison of source and target texts) to find out whether the stress reported during retrospection affects the product. The segments in which participants reported stress are analysed in search of 3 types of disfluencies: anomalous pauses exceeding 2 seconds, hesitation markers and false starts. The analysis also aims at investigating the relation between stress and directionality. The results show that the majority of target-text segments in which trainees reported having experienced stress are marked by disfluencies. The most frequently mentioned stressors are the delivery rate of the speaker, lexical search under time pressure, and interpreting failure in the preceding part of the text. Trainees have been found to cope with stress in most cases adopting the economy of expression strategies. These types of strategies were also adopted as stress prevention mechanisms. Another finding of the study reveals that stress is reported considerably more frequently in the retour than in the native.

**Keywords:** stress; simultaneous interpreting; trainee interpreters; process research; retrospective protocols.

## 1. Introduction

Ever since its emergence in Nuremberg Trials, simultaneous interpreting (SI) has always been recognized as an extremely stress-provoking activity. It is hardly surprising then that stress experienced by interpreters working in this mode has sparked a widespread interest among Translation & Interpreting Studies researchers, who investigated a wide variety of aspects of stress provoked by SI with the aid of different research methods. The studies conducted so far range from those adopting physiological measures, which set out to measure objectively the levels of stress experienced by interpreters (e.g., Klonowicz, 1994; Korpál, 2016), to those focusing on subjective experience of stress as related by the people performing the interpreting task. The latter tend to use psychological self-reporting tools such as questionnaires and interviews (e.g., Riccardi et al., 1998; Walczyński, 2019).

This study is hoping to contribute to the existing body of research by investigating trainees' perception of stress with the aid of another self-reporting method—the retrospective verbal protocols. To the best of our knowledge, this self-report tool has not been adopted so far in this form to probe into stress in SI. The study relies on a corpus of 5,005 retrospective comments of trainee interpreters, in which they were simply instructed to comment on their process of interpreting (consciously taken decisions and the reasons behind them). By using unguided self-retrospection of the participants without asking specifically about stress experienced by them we hope to obtain spontaneous, unbiased reports and in this way cast some light on the trainee interpreters' experience of stress. The retrospective reports are analysed in search of the sources of stress and the coping and/or preventive strategies trainees employ when confronted with a stressful interpreting situation. This study triangulates this process method with product analysis of simultaneous interpreting outputs of the participants in order to test to what extent the reported stress is manifested in their target texts. The segments in which participants reported stress are analysed in search of 3 types of disfluencies: anomalous pauses exceeding 2 seconds, hesitation markers and false starts. The aim of this part of the analysis is to find out to what extent advanced trainee interpreters are able to effectively mask the experienced stress and to what extent it affects the quality of the target text resulting in the above-mentioned disfluencies. As the corpus of the target texts in this study comprises interpreting outputs in both the native and the retour in equal proportion, the objective of this study is also to investigate the relationship between stress and directionality.

Before we present the results of the analysis, first we would like to provide an overview of the research to date on the aspects pertinent to the present study. First we outline the constraints inherent in simultaneous interpreting, which serve as potential stressors for those performing it (Section 2). Following this, we present a literature review on stress in simultaneous interpreting, paying special attention to the studies adopting self-reporting tools (Section 3.1) and the ones which deal with stress as experienced by trainee interpreters (Section

3.2), as these two aspects constitute the core of the present study. Closing the theoretical section, we discuss linguistic indicators of stress (Section 4).

## 2. The difficulty of simultaneous interpreting

Simultaneous interpreting is beyond doubt one of the most cognitively demanding activities. The main difficulty of this mode of interpreting lies in extreme multitasking. As emphasised by Gile (2009), interpreters are required to perform concurrently the tasks of active listening, speaking, and storing information in short-term memory. Additionally, a considerable amount of their processing capacity is consumed by coordination of the three simultaneous processes. What makes it even more difficult is that these processes are non-automatic to a much greater extent than in any other form of communication. The very name of the model which accounts for the complexity of this type of cognitive processing—the Effort Model (Gile, 2009)—emphasises the strain simultaneous interpreting imposes on those who perform it. To illustrate the extent of difficulty involved in simultaneous interpreting (SI), the author of this model compares metaphorically this mode of interpreting to performing acrobatic feats on a tightly stretched rope. His tightrope hypothesis assumes that most of the time interpreters work close to cognitive saturation.

Apart from multitasking and extreme cognitive load, there are other factors that pose a challenge for interpreters. First of all SI is a highly time-constrained activity. The interpreter has no control over the pace of source-text delivery. Moreover, all the decisions regarding the lexical choice and the syntactic structure of the target text have to be taken in a matter of seconds and there is no revision phase. The first version is the final one, which means that interpreters can permit themselves only the most local self-corrections (see, e.g., Pöchhacker, 2015). Another impeding factor is the linearity constraint, also referred to a short-horizon constraint, which means that the interpreter only receives subsequent chunks of information as the source text develops and also has no access to previously processed segments (see, e.g., Gumul, 2011). Moreover, the risk of communication gap is higher in simultaneous interpreting due to external sourcing of the message and the audience design in a conference interpreting setting. The interpreter's task consists in conveying someone else's ideas, line of reasoning, judgements, and intentions. Additionally, unlike in community interpreting, in a conference setting interpreters have to deal with highly specialised discourse, as both speakers and audience are experts. Even with the most comprehensive prior preparation, interpreters are unlikely to boast the same level of expertise in a given field (see, e.g., Gile, 2009). Another factor is the memory load. Although the strain on memory is not as high as in consecutive interpreting, the simultaneous mode also taxes the interpreter's short-term and working memory to a considerable extent (see, e.g., Bajo & Padilla, 2015; Chmiel, 2018). The interpreter working in this mode has to store in memory not only what has just been expressed by the speaker, but also needs to remember how s/he has started the sentence to avoid syntactic incongruity. Some

features of the source text may also aggravate the difficulty: numbers, enumerations, proper names, information density, and high delivery rate. All these factors are likely to induce stress, a condition we shall discuss in the subsequent section.

### 3. Stress in simultaneous interpreting

Researchers from different fields observe that stress is a concept which is not precisely definable. To the best of our knowledge, no single theory or model of stress has been universally accepted. The term stress, coined by a medical researcher Hans Selye in the 1930s, is described as “a psychological reaction experienced when an individual feels an imbalance between task requirements and the resources available for coping with them” (Riccardi, 2015: 405). It is often used together or interchangeably with a related concept of anxiety, which is considered to be an emotional manifestation of stress (Korpál, 2017: 120).

With the advance of professionalisation emerged the idea of occupational stress, i.e., psychological and physiological response to events and conditions in the workplace and professional task itself. Simultaneous interpreting is believed to be one of the most stressful occupations (see, e.g., Zeier, 1997; Riccardi et al., 1998; Kurz, 2003). Likewise, interpreting for training purposes in classroom situation is also perceived as stressful by trainees (e.g., Jiménez Ivars & Pinazo Calatayud, 2001; Walczyński, 2019), even though the burden of professional responsibility is not present.

Although interpreting has always been assumed to be a stressful activity, empirical research providing evidence for such claims has emerged relatively recently. The first large-scale study was carried out as late as in 1980s by Cooper et al. (1982). The body of research concerning stress experienced by interpreters conducted in the last three decades forms a trend, which Korpál (2016) refers to as a psycho-affective turn in Interpreting Studies. These studies approach the construct of stress from different perspectives and were conducted using a variety of methods. There are numerous studies which rely on physiological measures to investigate the level of stress experienced by interpreters. Among the physiological manifestations of stress investigated so far are measures of cardiovascular activity, such as blood pressure (Klonowicz, 1994; AIIC, 2002; Korpál, 2016) and heart rate (Klonowicz, 1994; AIIC, 2002; Kurz, 2003; Korpál, 2016, 2017); other physiological measures of arousal, such as galvanic skin response (Kurz, 2003); assessment of biochemical markers, such as cortisol concentration (Moser-Mercer et al., 1998; Moser-Mercer, 2005; AIIC 2002), and immunochemical assay of Immunoglobulin M (IgM) levels (Moser-Mercer, 2005). The research tools adopted in such studies allow for an objective testing of interpreters' reaction to stress. There are also studies that approach the phenomenon of stress from a different perspective—focusing on the subjective experience of stress related by interpreters. This psychological angle is particularly relevant for the present study as it relies on self-reports of trainees.

### 3.1. Self-reported stress

In Lazarus' appraisal theory of stress (Lazarus, 1977; Lazarus & Folkman, 1984), stress is regarded as a subjective notion closely linked to an individual's subjective perception of the difficulty of the task. This observation legitimises the studies relying on interpreters' accounts of stress and other self-report measures, since they provide an insight into how interpreters' emotional response is based on their own appraisal processes. It is not only the 'objective' stress, but also individuals' perception of stress that has been found to influence a person's well-being and task performance in great measure (Kurz, 2003). Moreover, as Taylor (1995: 225) observes, determined conditions are stressful "to the extent that they are perceived as stressful" (after Riccardi et al., 1998: 99). Therefore, self-report measures of experienced stress have played a vital role in psychological research on stress and its consequences (Morgan et al., 2014).

The studies that probe into interpreters' perception of stress usually adopt survey research design in one of its many variants, often triangulated with other methods. For instance, Cooper et al. (1982) used the interview format in combination with questionnaires and the respondents' stress logs to probe into professional interpreters' impressions and opinions. With the objective of identifying the sources of occupational stress among conference interpreters, the researchers analysed data from 33 interviews and stress logs as well as a questionnaire targeted at a larger population of 826 members of International Association of Conference Interpreters (AIIC). The use of self-reports allowed the researchers to reach an interesting conclusion which demonstrates the importance of self-reporting as a research tool in investigating stress. Their results indicate that interpreters' individual perception of stress exerts a more significant influence on the performance of interpreters than the objective stressfulness of this profession, which would translate into the role of personality traits and in consequence individual differences in responding to stress (Cooper et al., 1982).

The questionnaires probing into psychological stress were also used by Moser-Mercer et al. (1998), who combined this method with physiological measures and performance assessment. The authors' objective was to determine to what extent prolonged interpreting turns (i.e., longer than the standard turn time of 30 minutes) affected the interpreters' level of stress and the quality of their outputs. The results of a self-administered questionnaire completed by the respondents indicate that interpreters' stress-coping mechanisms tend to decline as a consequence of mental overload in turns exceeding 30 minutes. In such conditions they exhibit non-adaptive response to stress ("not engaging in any attempt" as put by Moser-Mercer et al., 1998: 60) which results in inefficient performance.

The psychometric measures were also adopted by Riccardi et al. (1998) in their investigation of two stress-related factors, i.e., anxiety and depression in the context of remote interpreting. The subjects in their study were administered three tests: the ASQ - IPAT Anxiety Scale, the CDQ - IPAT Depression Scale, and the personality test MMPI-2. The ASQ - IPAT Anxiety Scale

is a brief test in a questionnaire form. It has been developed to give an accurate appraisal of anxiety level of the respondents. In turn, the CDQ - IPAT Depression Scale is a 40-item questionnaire based on factorial analysis that provides reliable estimates of depression. Both tests were administered twice: before and after the task. The subjects in Riccardi et al.'s (1998) study were also asked to complete MMPI-2—an extensive personality test used to determine the examinee's personality traits and emotional disturbances. As the study aimed at comparing professionals and trainees, its results will be briefly presented in Section 3.2, dealing with stress experienced by trainee interpreters.

Questionnaires were also used in a correlational study of Jiménez Ivars and Pinazo Calatayud (2001) to determine the relation between state anxiety and fear of public speaking in interpreting students as well as the impact of these two factors on their consecutive interpreting performance. The adopted testing instruments were the “Confidence in public speaking” questionnaire by Méndez et al. (1999), developed on the basis of the existing instruments based on self-reports to measure fear of public speaking, and the STAI (State-Trait Anxiety Inventory) questionnaire. The former is a short 12-item questionnaire which assesses the fear felt by the respondent probing into their degree of self-confidence. In this test lack of confidence in public speaking is identified with fear of the situation. In turn, the latter (STAI) is a more extensive self-reported instrument composed of 40 questions which evaluates both state and trait anxiety. In their research Jiménez Ivars and Pinazo Calatayud (2001) used the State Anxiety Scale of STAI, which aims at measuring anxiety induced by a particular situation, i.e., at the time of a perceived threat. The results of this study reveal a positive correlation between low confidence in public speaking and high scores in state anxiety. However, neither state anxiety nor fear of public speaking were found as detrimental to interpreting quality. The implications of these results for training contexts will be discussed in the subsequent section.

The STAI questionnaire was also administered to the subjects in Moser-Mercer's (2005) experimental study, in which she combined physiological measures of cortisol concentration and Immunoglobulin M (IgM) levels with psychometric instruments. In contrast to the study of Jiménez Ivars and Pinazo Calatayud (2001), the researcher used both scales: State Anxiety Scale and Trait Anxiety Scale. She combined this questionnaire with other psychometric instruments: Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), which was used with a view to determining the interpreter's general personality profile, and a standardised questionnaire concerning technical aspects of the remote interpreting situation. The researcher's aim was to investigate the effects of remote interpreting on stress and fatigue experienced by professional interpreters and to determine whether these factors would compromise the quality of their outputs. Interpreters' self-reports reveal that working under remote conditions is considered to be more stressful than working live in a conference room. One of the stress-inducing factors reported by the participants in this experiment is the sensation of the lack of control in a remote setting, which, coupled with fatigue, was reflected in their performance. What is interesting, contrary to interpreters' self-assessment, stress hormone values



did not show significant variation between their working under live and remote conditions for all interpreters. Some of them displayed comparable values in both working conditions.

Another research which adopted the self-reported instrument of STAI is the correlational study of Chiang (2010), in which he sought the correlation between trait anxiety and foreign language anxiety in trainees. In order to determine the role of foreign language anxiety in interpretation students' learning outcomes, he combined the Trait Anxiety Inventory with the Foreign Language Classroom Anxiety Scale (FLCAS) questionnaire. The latter tool was adopted in order to operationalise the notion of foreign language anxiety. The FLCAS questionnaire was also used in researcher's previous study (Chiang, 2009), in which he tested empirically anxiety experienced by interpreting trainees in the classroom. The results show that a substantial number of interpreting trainees experience foreign language anxiety (Chiang, 2009) and that there is a positive correlation between trait anxiety and foreign language anxiety (Chiang, 2010), although neither of these conditions appears to have an impact on the student's learning outcomes (see also Section 3.2).

Questionnaires have also been adopted by Roziner and Shlesinger's (2010) study combining survey research with experimental design. One of the aims of this extensive study was to investigate subjective psychological manifestations of stress and burnout in remote and live interpreting. With a view to determining professional interpreters' workload and tension ratings, stressor perception, their need for recovery, and the extent of burnout they experienced, the participants were asked to report on their subjective perception of stress in questionnaires designed by the authors of the study. All of these instruments were administered four times during a span of four weeks. Similarly to Moser-Mercer's (2005) study, there were some discrepancies between subjective ratings of stress and objective measures of stress. Whereas self-reports revealed that the interpreters perceived remote conditions as more stressful, no statistically significant differences were observed when it comes to measures of physiological stress.

Kao and Craigie (2013) are the authors of another study relying on self-reporting instruments. The researchers set out to assess psychological stress experienced by interpreting trainees in the classroom situation by administering two questionnaires to their subjects: the Interpretation Classroom Anxiety Scale (ICAS) developed by Chiang (2006) and Amirkhan's (1990) Coping Strategy Indicator (CSI). ICAS integrates four parts with 44 items which focus on communication apprehension, test anxiety, fear of negative evaluation, and cognitive processing anxiety. In turn, the CSI was adopted to investigate whether and to what extent the respondents in this study displayed different types of coping behaviour: problem-solving coping, avoidance coping or seeking social support coping. The results of this study reveal high levels of psychological stress for the majority of interpreting trainees (see Section 3.2).

Another study in which data was collected with the aid of questionnaires was conducted by Arnaiz-Castro and Pérez-Luzardo Díaz (2016). In their research focusing on anxiety-generat-

ing nature of the interpreting task, they used an adapted version of the Foreign Language Classroom Anxiety Scale (FLACS), the Academic Autoconcept Scale of Schmidt, Messoulam & Molina (2008), and a background information questionnaire. With the aid of these tools they measured the correlation between anxiety and academic self-concept in interpreting trainees. The results obtained by Arnaiz-Castro and Pérez-Luzardo Díaz (2016) show that students that exhibited higher anxiety levels tended to have lower self-concept levels.

Self-reporting instruments also form part of Korpál's (2017) comprehensive research design in his study of linguistic and psychological indicators of stress in simultaneous interpreting of both professionals and trainees. He triangulated physiological measure of heart rate with survey research tools: X-1 form of the STAI questionnaire to measure self-reported anxiety, and the CISS (Coping Inventory for Stressful Situations) questionnaire in combination with semi-structured interviews to inquire into the subjects' stress coping strategies. Korpál's results revealed that high delivery rate imposed by the speaker is a significant stress-inducing factor and has a negative impact on interpreting outputs in terms of their accuracy.

Walczyński's (2019) mixed-method research design relied heavily on self-reporting instruments as well. In his study of consecutive interpreting of trainees and certified interpreters, apart from the qualitative analysis of the product and interpreters' consecutive notes, he used two types of self-designed questionnaires to probe into the respondents' experience of a wide range of psycho-affective factors ranging from stress, anxiety, and fear through language ego / language inhibition and extroversion/introversion to self-esteem and motivation. Immediately after interpreting, the trainees were administered a questionnaire composed of 28 open questions in order to elicit their account of the psycho-affective factors experienced during the particular interpreting task they had just completed. There were also some questions related to their subjective assessment of the quality of their performance. In turn, the other group of participants in this study—certified interpreters—were asked to fill an online questionnaire concerning their experience of the psycho-affective factors on their interpreting practice. In both questionnaires the respondents were provided with definitions of the analysed psycho-affective factors. Both groups of respondents reported negative impact of stress and anxiety on their performance describing a wide range of linguistic and extra-linguistic manifestations, including errors and omissions as well as different physiological reactions.

In his recent study of stress in the context of dialogic interpreting situations, Darias Marrero (2020) also employed a self-reporting tool. With the aim of determining stress-inducing factors for conference interpreters participating in press conferences and those working in a hospital setting, he conducted a series of semi-structured interviews. The interpreters were asked to indicate and describe stressors. The results of this study imply that although the two groups differ in terms of their exposure to stress-inducing factors, they are comparable as far as the level of the stress they experience is concerned.

This overview of studies shows a variety of self-reporting research instruments. In this study we shall adopt another research tool probing into interpreters' subjective experience of stress, which is the method of retrospective verbal protocols (described in detail in Section 5.1). As our aim is to tap into trainees' experiences, in the subsequent section we shall present the major findings from previous research concerning this group.

### 3.2. Stress experienced by trainee interpreters

The experience of stress of trainees and professionals is not directly comparable. Professional situation and real-life assignments impose different demands on interpreters. Therefore, the emotional strain is bound to be different. The stakes also appear to be higher in the professional context than in the case of academic failure. The burden of responsibility for effective communication in a context with fewer shared references, the ethics of service, and ultimately the risk of losing a client, to mention just a few workplace-related stressors, are likely to take greater emotional toll on the practising interpreters. Also, because of completion of training and their experience, they are likely to have developed effective stress-coping strategies and stress resistance as a result of repeated exposure to the interpreting task and comparable job situations.

Nevertheless, trainee interpreters have also been found to experience stress to a great extent. The exams, mock conferences or even the classroom situation appear to be highly stress-inducing environments, as demonstrated by numerous studies. The results obtained by Riccardi et al. (1998) imply that in fact trainees may be more prone to experience stress than professionals. In their study even a mock conference setting was considered to be more stressful by trainees compared with real-life assignments as perceived by professionals. The researchers attribute this difference to the mastery of effective stress-coping strategies by the latter group. Professionals have been found to demonstrate a more adaptive response to stress (Riccardi et al., 1998: 103). Similar conclusions have been reached by Kurz (1997, 2003), who observed elevated physiological stress levels in trainees. According to her, "conference interpreters have better situation-dependent control over their anxiety in a positive way". They are also "consistent performers' able to maintain an even performance under stress" (Kurz, 2003: 55). By contrast, trainees lack extensive experience and often have insufficient command of interpreting technique. These factors are believed by Kurz (2003) to reinforce stress in training situations.

Stress experienced by student interpreters in a mock conference setting was also examined by Jiménez Ivars and Pinazo Calatayud (2001). The additional stress-inducing factor in their study was the investigated mode of interpreting—consecutive interpreting, in which interpreters are more exposed to public scrutiny than in the simultaneous mode. As mentioned in the previous section, the results obtained by these researchers show that trainees with lower confidence in public speaking tended to report higher scores on state anxiety scale. Neverthe-

less, they apparently demonstrated coping strategies and sufficient self-control mechanisms to mitigate stress because this emotional condition did not compromise the quality of their academic performance to any significant extent. The researchers mention such factors as: wish to face a challenge and demonstrate competence, activation of personal interpreting resources, sense of self-efficacy (i.e., the belief in one's capability to carry out a task), as well as maturity and responsibility, since the subjects in this study were the final-year students (Jiménez Ivars & Pinazo Calatayud, 2001: 114-115). The role of the training stage is also visible in the results of Arnaiz-Castro and Pérez-Luzardo Díaz (2016). In their study younger trainees reported higher anxiety levels and had lower self-concept levels.

Trainee interpreters are also prone to classroom anxiety, which is often compared to foreign language classroom anxiety. In fact, the latter has also been found to be a source of stress for interpreting trainees despite their high level of language proficiency (which is an admission pre-requisite in interpreting courses). Similarly to foreign language learners they tend to suffer from three types of performance anxieties: communication apprehension, test anxiety, and fear of negative evaluation. One-third of subjects in Chiang's (2009) study experienced foreign language anxiety. Apart from this factor, trainees also experience interpreting classroom anxiety, which is the condition directly related to the interpreting task they perform in the classroom situation. As much as 85% of trainees in the study of Kao and Craigie (2013) reported having experienced a high level of psychological stress while interpreting.

This subjective perception of stress may aggravate in exam situation, as evaluation is an important aspect that is likely to increase anxiety. Fear of teachers' criticism has been found to be one of the major sources of anxiety for trainees (Hansen & Shlesinger, 2007). This is also evidenced by the results obtained by Walczyński (2019). All three groups of subjects in his study, who were undergoing training at undergraduate, graduate, and post-graduate levels respectively, reported having experienced stress, fear, and anxiety during in-class consecutive interpreting test. Unlike in the study of Jiménez Ivars and Pinazo Calatayud (2001), in most cases these psycho-affective factors had a negative impact on the quality of the final product, which was evidenced not only by the subjects' reports, but also the analysis of the outputs. Through the analysis of self-reports and the trainees' consecutive interpreting notes, Walczyński (2019) also observed that such psycho-affective factors hindered the very process of interpreting.

Korpál's (2016, 2017) research shows that it is the very activity of simultaneous interpreting that can generate the sensation of stress in those performing it, even in a context where no evaluation or peer-review is involved. The trainees participating in his experimental studies recorded in laboratory conditions experienced both physiological (Korpál, 2016, 2017) and psychological stress (Korpál, 2017), whose levels increased when they had to cope with high delivery rate of the source text. Regardless of this factor, the novices in Korpál's (2017) study reported that one of the major stressors in simultaneous interpreting was multitasking. The

analysis of the product revealed that stress induced by high delivery rate affected negatively the accuracy of the outputs. This study also aimed at eliciting reports about stress-coping mechanisms, adopted to mitigate stress, in semi-structured interviews with the participants. Trainees reported having resorted to positive reinterpretation of the situation, relying on one's self-esteem, focusing on the task, prior preparation, and relying on boothmate's help.

#### 4. Linguistic indicators of stress

Apart from physiological measures and self-reporting instruments, some of the above-mentioned studies performed additionally an analysis of output data (Korpál, 2017; Walczyński, 2019) to determine to what extent stress can influence the product. In his analysis of the outputs of the subjects in his study Walczyński (2019) used five parameters, which form part of most standard performance evaluation forms: equivalence (conveying the sense of the original message and the equivalence of the communicative effect), grammatical correctness, vocabulary (in terms of relevance and appropriacy of use), correct pronunciation and intonation, and fluency of delivery. As mentioned before, the majority of the consecutive interpreting outputs analysed in his study were adversely influenced by different psycho-affective factors.

Some aspects of output quality were also examined in Korpál's (2017) study of stress in simultaneous interpreting. He took into account the accuracy of rendition, which was operationalised as the number of correctly rendered numerical data items. Approximated, incorrectly rendered, and omitted numerical data served as indicators of compromised accuracy and markers of stress.

Korpál (2017) also relied on linguistic measures of stress in his analysis. One of them was the acoustic measure of fundamental frequency (commonly referred to as pitch), considered to be one of the most reliable acoustic measures of stress. Fundamental frequency values were analysed with the aid of Praat software. Korpál's results show that pitch values tended to increase for interpreters who performed in conditions of high delivery rate.

The other linguistic measure of stress in his study was the number of hesitations, which included voice breaks, nervous false starts, and disfluencies. The last notion is used here in a very broad sense, after Silverman and Silverman (1975), possibly partly overlapping with the two previous categories as it includes repetition of an entire lexical item or part of it, reiteration of phrases, insertion of meaningless fillers (ah, um), and prolonging or breaking sounds, some of which are classified as false starts in literature. Although in his study high delivery conditions did not have a significant impact on the number of hesitations in either trainees or professional interpreters, Korpál (2017) acknowledges the potential of such markers in research on simultaneous interpreting, given the facility of abstracting them in contrast to measuring fundamental frequency values, which require complex phonetic analysis and specialist software.

The relationship between stress and speech disfluencies has also been observed by Igras-Cybulska et al. (2016), who see stress as one of the factors in determining patterns of pauses in speech in terms of their frequency and length in their analysis of three types of spontaneous speech: simultaneous interpreting, presentations, and radio interviews. There are also studies in which disfluencies are interpreted as the so-called problem indicators (e.g., Englund Dimitrova & Tiselius, 2014). Some researchers also relate them to a cognitive load imposed by the task and/or an increased cognitive effort experienced by speakers/interpreters (Hale, 2004; Defrancq et al., 2015; Gumul, 2019, 2020).

As such conditions might be potentially stress-inducing, in the present study we shall rely on three types of disfluencies as possible linguistic indicators of stress in the product: hesitation markers, false starts, and anomalous pauses. They do not affect sentence meaning in any way, but perturb utterance fluency. As these hesitation phenomena are variously delimited in literature, we shall describe how they are understood for the purpose of the analysis conducted in the present study.

The first category are hesitation markers, also referred to in literature as filled pauses, fillers (Bortfeld et al., 2001), or “ah” speech disturbances (Mahl, 1987). They are understood here in a narrow sense of only those non-lexical fillers that assume the form of meaningless strings of sounds, often prolonged. They are vocalised in a variety of ways depending on the language. For instance, in Polish such hesitation markers typically assume the form of prolonged vowels “yyy”, “eee”, and “mmm” (Igras-Cybulska et al., 2016), while in English such non-lexicalised items typically are the phonetic combinations including the following sounds: [ɛ, æ, r, ə, m] (Maclay & Osgood, 1959).

The second type of disfluency, false starts, are only limited in this study to cases of word truncation. These are two types of retraced false starts: when an interpreter produces part of a word (usually the first syllable) and then the whole word (e.g., “si... silly ideas”) or starts a word and then proceeds to produce a different one (e.g., “si... stupid ideas”) (Gilquin, 2008). We also take into account non-retraced false starts, which means that part of the word has been produced, but the interpreter has not made any attempt to correct it. The analysis is only limited to self-interrupted utterances at the word level, as more extensive false starts at the level of the sentence structure might stem from the specificity of simultaneous interpreting. In this mode of interpreting, owing to the overlap of two lines of discourse, the interpreter is often unable to wait for the whole sentence to disambiguate and as result embarks on a sentence structure which proves to be a wrong choice. The false start is thus a consequence of an insufficient delay rather than anxiety.

The last category of disfluencies analysed in this study are unfilled silent pauses, where no voice activity is recorded. We only took into account pauses exceeding 2 seconds, since this time lapse is considered as the threshold value for anomalous pauses in studies investigating

fluency in simultaneous interpreting (e.g., Pradas Macías, 2006). Adopting the minimum length of 2 seconds as the threshold value means that we can discard other types of pausal phenomena: breath pauses caused by natural respiration activity and intentional pauses used for stylistic reasons to give emphasis or to mark syntactic boundaries. Both unfilled pauses and false starts are classified as the so-called non-ah hesitation phenomena (Mahl, 1987).

It has to be emphasised that adopting these types of disfluencies as potential markers of stress should be treated with caution. After all, these are inherent features of spontaneous encoding. Moreover, hesitation phenomena may also be attributed to individual style of speech production. It is also important to stress that non-ah speech disfluencies have been found to be indicative of speaker's state anxiety to a greater extent than hesitation markers (Mahl, 1987). In the case of the latter category, the evidence from empirical research is still inconclusive. However, since in the present study we only take into account hesitation phenomena in those target text-segments in which stress has been reported by interpreters, the assumption has been made that they may be stress-induced.

## 5. Research design

### 5.1. Method

The study triangulates two research methods: the analysis of retrospective protocols (process-oriented analysis) with manual comparison of source and target texts (product-oriented analysis). The method of retrospective protocols, originating from cognitive psychology (Ericsson & Simon, 1993), consists in eliciting verbal reports from the subjects after completion of the interpreting tasks. It is one of the few process-oriented methods available to investigate simultaneous interpreting, in which concurrent verbalisations of think-aloud protocols are impossible and keylogging or pupillometry have no use. Retrospective protocols are an established research method for investigating different aspects of translation and interpreting (see, e.g., Ivanova, 2000; Vik-Tuovinen, 2002; Napier, 2004; Englund Dimitrova & Tiselius, 2009, 2014; Gumul, 2017, 2020; Herring & Tiselius, 2020, etc.). However, this method has certain limitations, which have to be borne in mind when designing a retrospective procedure.

One of the inherent weaknesses of retrospection is memory decay. Ericsson and Simon (1993) observe that complete recall can only be ensured for tasks not exceeding 15 seconds, which is obviously not viable in interpreting. We believe that a procedure designed to gather verbalisations after such short interpreting spans would be too intrusive. This obstacle can be compensated to a certain extent by undertaking retrospection immediately after the interpreting.

In the present study there was only a short pause separating the two tasks during which the participants received brief instructions on how to perform retrospection. Another way of limiting memory decay is using retrieval cues, which are meant to stimulate memory. Cueing



during retrospection can be done through exposure to the source text (recording or transcript), target-text recording or researcher's questions. In this study we used dual-track recordings of the participants' outputs (target text with the source audible in the background).

Retrospective protocols have also been criticised for lack of veridicality and the risk of obtaining inferences and speculations about the cognitive processes rather than recall of the actual thought episodes (see, e.g., Englund Dimitrova & Tiselius, 2014). To limit the negative impact of this factor, the subjects in this study were asked to perform self-retrospection. It means that verbalisations were elicited with the recording of the target texts without any prompting of the researcher other than prior instructions. We believe that asking additional questions could induce them to speculate about the thought processes and comment on stress even in the absence of actual memories.

In order to ensure ecological validity of the study and prevent the white-coat effect (e.g., trying to help the researcher or installing false memories), at no stage were the participants informed about the actual research object. The aim was to avoid unnatural behaviour on the part of the participants. They were simply informed that the research concerned simultaneous interpreting of trainees and were asked to report all consciously taken decisions and the reasons behind them.

## 5.2. Materials

The material for the present analysis was recorded for the purpose of another project (Gumul, 2017), but its research design makes it possible to use the obtained data to investigate other aspects of the simultaneous interpreting process. The corpus consists of 5,005 retrospective comments accompanying approx. 75 hours of recording of 120 trainee interpreters working in both directions of interpreting (Polish-English and English-Polish). The six source texts used in this study belong to three genres typically interpreted using the simultaneous mode of interpreting: conference presentations, commencement addresses, and political speeches (see Gumul, 2017, for a detailed description of the corpus). Each of the six source texts was interpreted by 40 subjects. Multiple renditions of the same source text allow to rule out to a certain extent the confounding variable of source-text influence and make it possible to observe interpreting behaviour under the same source-text conditions. The source texts used in this study were recorded by native lecturers to ensure a uniform rate of delivery for all texts of approximately 110-120 wpm.

## 5.3. Participants

The 120 participants in the study were advanced students of translation and interpreting (master and postgraduate level). The study follows a multi-site design to ensure external validity of the obtained data: the subjects were recruited from three Polish universities: University of Silesia in Katowice, the University of Gdańsk, and the College of Foreign Languages in



Częstochowa. Polish was the mother tongue and English a B language for the whole of the sample. At the time of conducting the study, all the participants had completed at least 120 hours of interpreting training.

#### 5.4. Procedure

The material was recorded in standard laboratories used for teaching simultaneous interpreting on the premises of the 3 universities whose students participated in the study. The task consisted of interpreting a 15 to 22-minute speech. Each of the participants was asked to work into both the native and the retour (i.e., interpreting two source texts), but in order to avoid the fatigue effect, the two directions of interpreting were recorded during separate sessions on different days. The order of speeches was counterbalanced across subjects to avoid a carry-over effect during retrospection.

Before the interpreting task the participants received a thorough briefing concerning the pragmatic setting of each speech: the details concerning the identity of the speaker, the profile of the target audience, time, venue, and the subject matter of each text. They were asked to interpret the recorded text and, immediately following the interpretation, they were asked to listen to the recordings of their own outputs. Each person was given control of the in-built recorder in the booth and was asked to stop the recording each time he or she remembered a consciously taken decision and comment on it aloud. The retrospective comments were recorded on the external source (portable dictating devices placed in the booths) activated by the researcher prior to the retrospective session. In order to simulate a real setting as much as possible, there were some people invited to act as the audience, although the participants were obviously aware that they were taking part in a recording for research purposes and not a real-life assignment.

Both the transcripts and the retrospective protocols were transcribed. The retrospective protocols were divided into individual comments referring to particular target-text segments. Both sources of data were coded. For the purpose of the present study the transcripts were coded for the three types of disfluencies described in Section 4: hesitation markers, false starts, and anomalous pauses. In turn, the retrospective protocols were coded for reports of stress or/and anxiety.

#### 6. Results and discussion

Out of the total number of 5,005 retrospective comments constituting the corpus of the present study 141 referred to stress. The reports referring to stress can be divided into two major groups: those reporting having experienced stress (107 comments) and those reporting having adopted stress prevention strategies (34 comments). Only the first category has been triangulated with the product analysis in search for disfluencies that are potentially

indicative of stress. The remaining 35 comments will be analysed separately, since the subjects do not report having experienced stress, but merely some preventive strategies used in order to avoid it.

Out of 120 subjects in this study 42 reported 107 times having experienced stress during SI task in one or both directions of interpreting. The number of retrospective comments reporting on stress per person ranges from 0 to 6 for both directions of interpreting ( $M = 0.89$ ,  $SD = 1.53$ , calculated for the whole sample of 120 subjects, and  $M = 2.54$ ,  $SD = 1.59$  for those 42 who reported having experienced stress). This result does not rule out that the remaining subjects have not experienced stress. The retrospective reports are incomplete by nature. Moreover, the subjects were not asked specifically to report stress, which, as explained in Section 5.1, could produce a white-coat effect. Thus, the participants may have as well omitted to report stress because they considered it irrelevant, because they did not want to admit having experienced negative emotions, or simply because they did not remember it at the moment of retrospection.

The results show considerable difference between the native and the retour as far as reporting stress is concerned. In total we obtained 35 verbalisations reporting the experience of stress in the native and 72 in the retour. The difference is confirmed by Wilcoxon Signed Rank Test, in which  $W = 57.5$  and  $p = 0.000$  prove statistical significance of the result (significant at  $p < 0.05$ ). It might be interpreted that the participants experience foreign language anxiety when interpreting into a B language. In this way this result would be consistent with the results of the studies which have provided evidence that production in a foreign language provokes anxiety in trainee interpreters (Chiang, 2009). However, none of the retrospective reports obtained in this study mentions explicitly foreign language anxiety. Even when they talk about foreign-language-related issues, like problems with lexical search, they point to the constraints of simultaneous interpreting as a major obstacle. Thus, the results would rather imply another interpretation of this result, namely that the cognitive load imposed by the retour interpreting is higher. This direction of interpreting is generally considered to be more cognitively demanding (see, e.g., Bartłomiejczyk, 2015) and due to that trainees working into a B language might possibly be more prone to stress.

Triangulation with the product reveals that the interpreting outputs have been affected by disfluencies to a substantial extent. The results of analysis of the target-text segments in which stress has been reported show that in only 14% of cases there are no disfluencies in the product (see Figure 1). The most frequent disfluencies are hesitation markers (31%). They also cooccur with other disfluencies—in 10% of TT segments they are either preceded or followed by an anomalous pause and in 7% they are accompanied in the same way by false starts. Another relatively frequent disfluency is anomalous pausing (21%) with additional 10% and 9% for cases of cooccurrence with other hesitation phenomena. False starts have the lowest frequency in the text segments in which stress was reported with only 8%.

**FIGURE 1**

The frequency of disfluencies in segments in which subjects reported stress

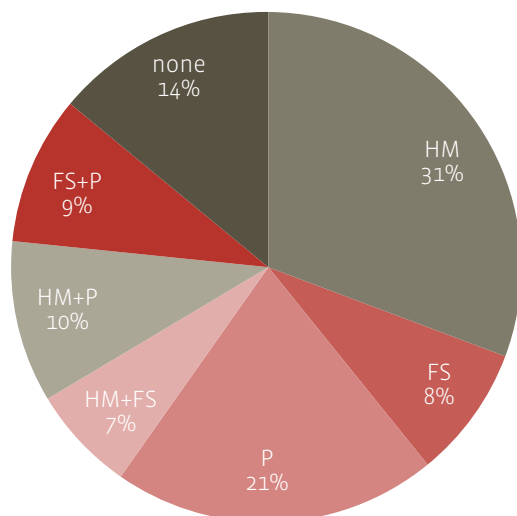


Table 1 below shows the distribution of disfluencies across the 107 retrospective comments reporting stress. In all cases the standard deviation is higher than the mean, which indicates that the participants in this study differ as to their predilection for a given type of hesitation phenomena. The difference between the standard deviation value and the mean frequency is particularly noticeable in the case of outputs in which no disfluency occurred in the segments in which stress was reported. There are only 6 participants in whose outputs there are no disfluencies in the segments in which they reported having experienced stress. In the case of 3 of them none of the reported segments displays any hesitation phenomena. This finding can be interpreted that these trainees have mastered the technique sufficiently to be able to control their performance. Nevertheless, in the case of the vast majority of participants in this study, stress experienced during the interpreting task compromises the quality of the product in terms of fluency. This finding implies that the trainees participating in this study have not dominated the interpreting technique sufficiently to be able to mask negative emotions.

**TABLE 1**

The frequency of disfluencies in segment in which subjects reported stress

	HESITATION MARKERS	FALSE STARTS	PAUSES	HM+FS	HM+P	FS+P	NO MARKER
<b>n</b>	33	9	22	7	11	10	15
<b>M</b>	0.78	0.21	0.52	0.16	0.26	0.23	0.35
<b>SD</b>	0.98	0.51	0.73	0.37	0.57	0.42	0.92

Table 2 lists stressors and coping strategies reported by the participants in their retrospective protocols. Due to the nature of the method of retrospective protocols and the research design adopted in this study, in which subjects are only encouraged to comment spontaneously and freely on what happened during the task under examination, the reports are not structured in any specific way. Therefore, some of them mention the stress inducing factor (the stressor), some of them report on the coping strategy, while others combine both aspects. There are also comments which merely report having experienced stress without explaining its source and the course of action taken. The vast majority of comments reporting stress mention the stressor (101 out of 107) and 81 indicate the coping strategy adopted to remedy the stressful situation.

**TABLE 2**

Stressors and coping strategies reported in retrospective protocols

<b>COPING STRATEGIES →</b> <b>STRESSORS ↓</b>	<b>OMISSION</b>	<b>GENERALISATION / CONDENSATION</b>	<b>ADDITION</b>	<b>CALQUE</b>	<b>SYNTACTIC SIMPLIFICATION</b>	<b>LACK OF SELF-CORRECTION</b>	<b>NONE</b>
Time pressure	4	2	0	1	1	2	0
Delivery rate	5	4	0	2	1	3	3
Multitasking	1	1	0	0	1	1	4
Linearity constraint	0	1	2	0	2	0	1
Lexical search	3	3	2	3	0	0	3
Comprehension	1	0	0	3	0	0	2
Specialist knowledge	1	1	0	3	0	0	1
Proper names	3	1	0	1	0	1	1
Enumerations	3	2	0	0	0	0	2
Numbers	4	2	0	0	0	0	2
Failure	2	3	1	1	0	2	2
Unspecified	2	1	0	1	0	0	2

The factor which is perceived as the stressor most frequently is the delivery rate of the source text (it is mentioned in 18 reports). Empirical evidence from other studies shows that high delivery rate is one of the most stress-inducing factors in simultaneous interpreting for both trainees and professionals (Barghout et al., 2015; Korpál, 2017). Although in the case of this study the delivery rate was controlled at the level of 110-120, which is supposed to be the most comfortable speed for an interpreter (see Barghout et al., 2015), some subjects' subjective perception was

that it was excessive and report it as a stressor. Such an impression might possibly be created by external pacing in itself and informational density of some segments. It might also be caused by processing problems and imported cognitive load. Nine out of 18 subjects who reported stress induced by the speaker's delivery rate resorted to the strategies involving the economy of expression (omission, generalisation, or condensation), as in the example 1 below. Three students resigned from self-correction when confronted with the delivery rate that produced anxiety in them. There are also two reports of calque and one of syntactic simplification.

(1)

P108/T5/B-A/RC8<sup>1</sup>: Unfortunately the speech was quite fast and I couldn't cope with everything. Despite stress I was trying to connect everything. I simplified the content and generalised it a lot just to be able to maintain the right pace of interpreting and keep up with the speaker. I think that this particular fragment wasn't that important for the sense of the speech<sup>2</sup>.

Problems with lexical search under constrained conditions of simultaneous interpreting, which require immediate recall of relevant lexical items, were considered as stressful by 14 participants. Such cases include both the situations in which trainees were confronted with an unknown word and those in which they could not recall the source-language equivalent of a lexical item. Gile's (2009) gravitational model of linguistic availability accounts for the latter case. In this model the use of lexis is assumed to depend heavily on the interpreter's cognitive ability to access linguistic knowledge in long-term memory store. Gile postulates that the cognitive load of the interpreting task reduces the availability of the lexis and makes it more difficult for an interpreter to recall it. Such a situation is described in the retrospective report below. Encountering a word whose equivalent the interpreter could not recall provoked stress. As a consequence she made an anomalous pause of 3.6 seconds, to which she refers in her report. This interpreting failure reinforced her anxiety. Being aware of the receivers' quality expectations and that long pauses are one of the most conspicuous signals of an interpreter's failure, she resorted to unjustified addition even though this proposition was not even implied in the source text.

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- 1 The symbol P refers to a given participant in this study, who, for the sake of anonymity, have been assigned numbers from P01 to P120. The symbol T has been used to mark the number of a source-text, B-A refers to the direction of interpreting (the native in this case), and the symbol RC refers to the number of a retrospective comment (beginning with RC1 for each interpreting output).
  - 2 The participants were free to choose the language of reports, or even to express themselves in the mixture of both, which some of them did. The vast majority of retrospective comments were made in Polish, so the versions that appear in this paper are the translations of the original verbalisations. In all provided back translations an attempt has been made to follow closely the wording, register, and the form of the original retrospective comment.

(2)

P03/T2/A-B/RC13: I got stuck on the word “whisper”. I couldn’t recall it and got stressed. That’s why I omitted a large fragment of the text.

P03/T2/A-B/RC15: I added “every day” because I was so stressed because of omitting the previous fragment and because of my long silence that I had to fill the silence somehow.

Interpreting failure experienced in the preceding segment/s appears to be one of the most frequently reported stressors as well. There are 11 reports that mention this stress-inducing factor. As reported by the trainee interpreter in example 2, negative assessment of one’s performance may apparently be a source of stress and compromise the quality of the interpreting output in the subsequent part of the text. In simultaneous interpreting successful processing depends on how previous segments have been handled and whether there is an imported cognitive load from preceding parts of the text. Gile (2009) accounts for this phenomenon in his idea of failure sequences, which assumes that in this mode of interpreting a given problem trigger might potentially give rise to errors, omissions, or infelicities as a result of processing capacity mismanagement rather than only because of its inherent difficulty. Moreover, it is not only the problematic segment that triggered failure which is affected, but also the subsequent segments that may pose no particular difficulty.

Some of the strategies employed to cope with the stress experienced during interpreting have also been used to prevent it. As mentioned before, 34 out of 141 retrospective comments referring to stress describe stress prevention strategies. The four types of preventive solutions reported by the subjects in this study are omission (17), condensation (7), calque (6), and syntactic simplification (4). These are mostly tactics that involve some information loss and compromise the target-text quality to some extent. However, estimating the damage and the potential emotional load, these trainees decided to opt for “lesser evil” solutions, as described in the example below, in which a proper name is considered to be a potential stressor.

(3)

P117/T5/B-A/RC9: I omitted “Second Marine Expeditionary Force” in the fragment “I want to thank Major General John Castelaw, Commanding General”. I think that any attempt to translate this proper name would take me too much time and it would be too stressful. So I only mentioned the name of the person and I went on with my interpreting.

## 7. Conclusions

We hope that the findings of this study may contribute to the investigation of psychological stress as experienced by trainee interpreters. At the most general level, the results are in line with previous research (Jiménez Ivars & Pinazo Calatayud, 2001; Kao & Craigie, 2013; Korpala,

2017; Walczyński, 2019), which shows that interpreting trainees suffer from psychological stress, even though their activity does not entail problems and risks encountered in real-life working conditions of conference interpreters. What is more, like the subjects in Korpál's (2017) experiment, the trainees in this study experienced stress even though there was no evaluation involved. Most of the participants who reported having experienced stress exhibit an adaptive response to this condition, which is evidenced by a variety of strategies they employ to remedy the situation. The subjects in this study also reported having resorted to product- and process-oriented stress prevention strategies. Despite the use of stress-coping mechanisms, the quality of the product is compromised by numerous disfluencies.

There is also an interesting conclusion with didactic implications that can be drawn from this study. Even though the participants in this study show high awareness and mastery of stress coping strategies, these are mostly product-oriented or aiming at facilitating their interpreting task. None of the subjects mentions psychological stress coping mechanisms, like positive reinterpretation or relying on self-esteem, both of which were reported in Korpál's (2017) study. This difference may be due to a certain extent to different research methods used in these two studies. Korpál relied on questionnaires, whereas in this study we relied on spontaneous verbalisations during retrospection, which means that the subjects were not asked explicitly about stress and therefore might in fact have resorted to such techniques, but simply failed to report them. Nevertheless, even taking into account these methodological considerations, it is surprising that none of the 115 retrospective verbalisations reporting strategies (counting both coping and preventive) mentions such psychological stress coping strategies. It might therefore be worth considering putting more emphasis on soft skills in the training curricula of the three universities whose students participated in this study.

Summarising this study, it is also important to mention some of its limitations. Laboratory setting compromises the ecological validity of the study to some extent. Thus caution is needed when generalising the results onto real-life training situations, like exams, which may be more stress-inducing. It would certainly be interesting to collect retrospective reports following an exam or a mock-conference organized for training purposes. Such data could provide a more complete picture of stress experienced by trainee interpreters.

Finally, it is worth mentioning that despite its inherent weaknesses and obtaining limited data, the method of retrospective protocols provides an insight into the experience of stress of simultaneous interpreting trainees. The use of this process-oriented method allows to see how stress affects the process of interpreting. The obtained data is certainly not complete, but this method permits to collect verbalisations that have not been stimulated by explicit questions about stress, which may provide a different perspective of the condition of stress experienced by trainees and complement other research methods.

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